SHATTUCK (F. C.)

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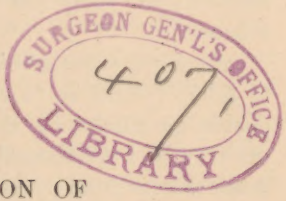

THE RELATION OF PNEUMONIA TO INFLUENZA IN BOSTON.*

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When I received the flattering invitation of your chairman to appear here this evening and speak on pneumonia as it appeared in Boston during the recent influenza epidemic, my first thought took the form of a wish that one more worthy of the honor had been selected; my second was how the subject could best be approached.

As it happened, though I have had cases both before and since, not a single one of my private patients had pneumonia during the influenza period. I saw a number of cases with other physicians, and had an unusual number in my wards at the Massachusetts Hospital; but consultation and hospital cases are not the most favorable classes for forming an estimate of the general severity of a prevalent disease. Either the disease is apt to be more severe, or the condition of the patients to be one of lowered vitality. The experience of any one individual may be very misleading. For instance, my hospital cases were of a very severe type, and the mortality was frightful—fifty per cent. I was thus led

* Read before the New York Academy of Medicine.

to believe that influenza pneumonia is of special gravity, a belief which the general statistics of both hospitals, with a mortality of thirty per cent., apparently show to be erroneous.

After some thought it seemed to me that the best plan to follow would be to collect and analyze all the cases of pneumonia admitted to the two larger hospitals in Boston—the City, and the Massachusetts General—and to study the death returns from pneumonia and bronchitis at the City Hall. The City Hall statistics are not as trustworthy as those of the hospitals, inasmuch as any man, woman, or child can, in Massachusetts, style himself or herself a physician and sign a death certificate.

It has been assumed that the influenza period in Boston extended from December 10, 1889, to February 1, 1890, and the hospital cases of pneumonia are all included between these dates. The City Hall returns have been taken for December, 1889, and January, 1890, as the labor of compilation would have been greatly increased by beginning at December 10th.

In the first place, allow me to consider briefly whether the past epidemic differed in any marked respect from those which have preceded it—a question not wholly foreign to the special subject of the evening. It seems to me probable that it did not. It was remarked in Boston, as also, if I err not, in other places, that the most striking feature of the disease was the prominence and frequency of nervous symptoms; the predominance of these, on the whole, over catarrhal symptoms, respiratory or abdominal. But I am inclined to think it possible that this is due simply to the fact that of late years our attention has been called more actively to the very important part played by the nervous system in disease of varied kinds. General prostration and violent pains in different situations are dwelt upon more or

less, almost without exception, by those writing on the disease since the earliest times. It must be remembered, also, that a period of forty years has elapsed since the last widespread epidemic of influenza, and that this period has borne a rich crop of fresh knowledge in all branches of our science. Moreover, in this, as in previous epidemics, the most dreaded concomitant, complication, sequel, or feature has been pulmonary inflammation, a term which, in this connection, seems to me to demand some consideration, in that it is inclusive of two processes quite different in origin and nature. It is not necessary before this audience to dwell on the distinction between lobar or croupous and lobular, catarrhal, or broncho-pneumonia. But it may be observed that, while in most cases the two processes are easily enough differentiated at the bedside, under certain circumstances the case is far different. Croupous pneumonia does not always take a lobar distribution, sometimes involving only a portion of one or more lobes, central or peripheral, often terminating by lysis. Broncho-pneumonia may, on the other hand, especially with the aid of atelectasis, take a distribution resembling, to say the least, that of the truly lobar variety, particularly the double form. The number of cases in which a certain diagnosis of croupous pneumonia can be reached is much larger than obtains with the catarrhal variety, and the personal equation enters more largely into the diagnosis of the latter, one observer attributing the fine râles to capillary bronchitis, modified respiration and dullness, if present, to atelectasis; another observer inferring, perhaps, from the same signs the presence of lobular inflammation. These remarks are made because many writers speak of broncho-pneumonia as the commoner affection in influenza, the catarrhal respiratory form of which would certainly seem to pave the way for its origin. But, as far as the Boston experience goes, broncho-pneu-

monia was relatively rare. The diagnosis of broncho-pneumonia was made in seven hospital cases, five proving fatal, but not followed by autopsy.

Two cases which I saw—one in consulting, the other in hospital practice—came clinically under the lobular rather than the lobar form. Both proved to be tubercular—one chronic but entirely latent until the influenza period; the other of the acute miliary variety. The latter was also interesting in that of ten sputum examinations, made with due care during life, nine were negative, and in the single positive one the bacilli were so scanty that some doubt was felt. Yet the lungs were crammed with miliary tubercles, and there was much secretion. These cases led me to question whether two other fatal cases in young adults, which I saw in consultation and in which no consolidation could be detected during life and no post-mortem was made, were not also tubercular, the bacilli of a latent focus or foci finding the opportunity for rapid growth and dissemination in the bronchial catarrh and prostration involved in the influenza.

The next question to claim attention is the relation of pneumonia to influenza. Is pneumonia a concomitant or a sequel of influenza, or does it stand in some more intimate relation thereto? An analysis of the Boston cases does not enable me to answer this question satisfactorily to myself.

The only means which I have for estimating the frequency with which pneumonia and influenza are associated is furnished me through the kindness of Henry Saltonstall, Esq., the treasurer, and M. E. Parker, Esq., the agent, of the Pacific Mills at Lawrence, Mass.* Of 4,242 employees of the mills, 1,699 (or forty per cent.) were severely enough affected by the influenza to be kept from work an average of

* Boston Med. and Surg. Journal, 1890, i, p. 251.

six days and a half each. Of these 1,699, 8 had pneumonia, as far as can be learned; 2 were fatal. There is some liability to error here, but it is certainly small. This would indicate that less than one half of one per cent. of fairly severe influenza was followed or accompanied by pneumonia.

Table I shows that the number of deaths returned in Boston as due to pneumonia was greatly increased, especially in January, over the previous five years, while, as far as one can judge, the whole number of cases of the disease was increased in still larger proportion, inasmuch as the ratio of fatal cases in the two hospitals was nearly four per cent. less than the average for the corresponding period in the previous five years (Table II).

TABLE I.

Deaths from Pneumonia reported at the Boston City Hall for the Months of December and January, 1884–'85 to 1889–'90, inclusive.

	1884–'5.	1885–'6.	1886–'7.	1887–'8.	1888–'9.	1889–'90
December ..	141	74	113	95	68	105
January....	103	83	91	183	92	332
Total...	244	157	204	278	160	437

TABLE II.

Cases of Pneumonia admitted to the Boston City and the Massachusetts General Hospitals from December 10th to February 1st, for the Years 1884–'85 to 1889–'90.

	1884–'5.	1885–'6.	1886–'7.	1887–'8.	1888–'9.	1889–'90
Total cases..	33	26	30	68	40	127
Deaths.....	14	4	12	26	13	38
Mortality.	42+%	15+%	40%	39%	32½%	30%

It was a matter of general observation that the first cases of influenza were mild, and the correctness of this observation is fully borne out by Table I, which shows that the deaths from pneumonia in December, 1889 (105), did not materially exceed the average for that month during the

TABLE III.

Deaths from Pneumonia reported at the Boston City Hall in December, 1889, and January, 1890, by Weeks.

Week ending—	Deaths.	Week ending—	Deaths.
1889:		1890:	
December 7	9	January 4	89
" 14	13	" 11	117
" 21	17	" 18	93
" 28	36	" 25	38
		February 1	25

preceding five years (98). But Table III shows that the number increased steadily, week by week, from that ending on December 7, 1889, to that ending on January 11, 1890, and then rapidly declined again. The increase was comparatively slight until December 21st, when it became rapid, especially in the week December 28th to January 4th. In the last week of January the number of fatal cases fell again to about the average of the previous five years.

Table IV shows the proportion of hospital cases in which pneumonia was preceded by grippe symptoms (forty-three per cent.). It will be observed that in twenty-nine per cent. such precedence distinctly did not take place, the number of these cases (36) being rather less than the average admitted to the hospitals the previous five years (43). Under the head "doubtful" are classed those cases in which pneumonia came on so soon, or the initial symptoms were so ill defined, that it can not now be determined whether these symptoms were prodromal of the pneumonia

or whether they belonged to the influenza. In the fourth class the histories are silent on this point.

TABLE IV.

Analysis of all Cases of Lobar Pneumonia admitted to the Boston City and Massachusetts General Hospitals, Dec. 10, 1889, to Feb. 1, 1890, with Reference to the Precedence of Grippe Symptoms, Localization, Complications, and Termination—Lysis or Crisis, or Death.

	Preceded by grippe symptoms.	Not preceded by grippe symptoms.	Doubtful.	No history.	Total.
Total, number	55	36	26	10	127
" per cent.	43	29	20	8	100
Single lobe, number	39	17	14	6	76
" " per cent.	71	47	54	60	60
Unilateral, more than one lobe, number	6	11	5	4	26
Unilateral, more than one lobe, per cent.	11	31	19	40	20
Double, number	10	8	7	..	25
" per cent.	18	22	27	..	20
Complicated, number	13	11	14	5	43
" per cent.	24	31	53	50	34
Recovery by crisis, number	15	7	3	..	25
" " " per cent.	44	44	21	..	36
Recovery by lysis, number	19	9	11	5	44
" " " per cent.	56	56	79	100	64
Death, number	11	14	8	5	38
" per cent.	20	39	30	50	30

It therefore appears that in a number of cases, nearly large enough for an average year, pneumonia of the ordinary type of onset occurred, while in a larger number of cases the pneumonia first came on the scene after the invasion of influenza. It does not seem to me safe to draw any positive deductions from these figures, but they appear to suggest that pneumonia is not a primary manifestation of influenza. Influenza may be merely a predisposing cause of pneumonia, or the latter may be truly a secondary manifestation of the former.

Other points shown by Table IV are the extent of the consolidation, the frequency of complications, the mode of termination of favorable cases, and the mortality.

In sixty per cent. of all the cases a single lobe was involved; in twenty per cent. more than one lobe on the same side; in twenty per cent. the pneumonia was double. In an indeterminable number of cases—a number larger, I am inclined to think, than in ordinary years, though I speak on this point with much hesitancy—the consolidation was irregular in distribution. That is to say, either a portion of only one lobe was involved, or else, in addition to complete consolidation of one lobe, patches of varying size were detected in another, the patients recovering or dying without further development of such patches.

In thirty-three per cent. of all the cases there were complications or sequelæ. Of these the most frequent were alcoholic delirium, phthisis, empyema, otitis, or facial erysipelas. Under this head there does not seem to be occasion for further remark. Of the 69 favorable cases * in which this point has been determined, sixty-four per cent. ended by lysis, thirty-six per cent. by crisis. If the temperature fell to the normal point within thirty-six hours, the case was classed under crisis; in far the larger proportion of these the fall occurred within twenty-four hours. There is, as far as I know, no generally accepted standard of sharp distinction between crisis and lysis—a fact which is embarrassing in this connection. I may be wrong, but it is my impression that ordinarily the proportion of cases ending by crisis is larger than it was this year during the influenza period.

* Some of the charts could not be found, so that the whole number of cases analyzed with reference to crisis and lysis is only 69, although 89 recovered.

TABLE V.

Lobar Pneumonia in the Boston City Hospital and Massachusetts General Hospital, December 10 to January 31, 1890.

AGE.	Cases.	Male.	Female.	Fatal.
10 and under	2	2	0	0
10 to 20	14	9	5	2 (14%+)
20 to 30	41	28	13	7 (17%+)
30 to 40	31	25	6	10 (32%+)
40 to 50	16	12	4	8 (50%)
50 to 60	13	9	4	7 (54%−)
60 to 70	1	1	0	1
70 to 80	1	0	1	0
Unknown	8	8	0	3
Total	127	94 (74%)	33 (26%)	38 (30%)

Table V shows the age and sex of the 127 hospital cases. Nearly seventy-five per cent. were males, and the mortality increased with each decade up to the fifth, remaining stationary thence to the seventh.

TABLE VI.

Fatal Pneumonia and Broncho-pneumonia reported at the Boston City Hall. Comparison between December, 1889, and January, 1890, and the average of the same months during the previous five years, with reference to age.

AGE.	Aver'ge deaths, Dec., 1884–'8.	Deaths, Dec., 1889.	Per ct. increase	Av'rage deaths, Jan., 1885–'9.	Deaths, Jan., 1890.	Per cent. increase
10 and under	36·2	37	..	36	56	55
10 to 20	2·6	3	..	4	14	250
20 to 30	8	26	225	8·8	43	388
30 to 40	10	22	120	17	54	218
40 to 50	11·8	28	137	15·6	57	265
50 to 60	11·4	18	58	11·8	50	324
60 to 70	11·2	15	34	13	38	192
70 to 80	9	8	..	10·2	28	175
80 to 90	3·8	3	..	2·2	13	500

Table VI compares the deaths from pneumonia and broncho-pneumonia returned at the City Hall in December, 1889, and January, 1890, with the average for the corresponding months of the previous five years with reference to age. The table shows that—

1. In December, 1889, there was no increase under twenty or over seventy.

2. In December, 1889, at other ages, especially between twenty and thirty, there was a marked increase.

3. In January, 1890, the increase was very marked and general, reaching the maximum eighty to ninety, twenty to thirty, and fifty to sixty.

TABLE VII.

Fatal Bronchitis reported at the Boston City Hall. Comparison between December, 1889, and January, 1890, and the average of the same months during the five previous years, with reference to age.

AGE.	Average deaths, Dec., 1884–'8.	Deaths, Dec., 1889.	Average deaths, January, 1885–'9.	Deaths, January, 1890.	Per cent. of increase.
10 and under.....	37·2	23	36·8	29	...
10 to 20	0·6	1	0·4	3	650
20 to 30	..	..	0·2	2	900
30 to 40	1	3	1·4	3	114
40 to 50	1·4	..	1·4	5	256
50 to 60	4·8	4	2·4	8	233
60 to 70	6	5	3·4	13	282
70 to 80	2·4	4	5	13	160
80 to 90	1·4	3	2·6	13	400

Table VII treats the cases reported at the City Hall as bronchitis in the same manner. The table shows that—

1. Deaths from bronchitis in December and January under ten years was less than the average.

2. That no notable increase in December, 1889, occurred at any age.

3. That in January, 1890, there was a decided increase

for every decade. The totals are, however, so small and the liability of error in diagnosis is so great that the totals and percentages have no great value.

Are there, then, any conclusions which can be drawn from the data given above? Yes, conclusions can be drawn, but they do not seem to me of such a nature as to throw any really new light on influenza pneumonia. They may be stated as follows:

1. Pneumonia was unusually prevalent in Boston during the height of the influenza epidemic, about the middle third of the visitation.

2. The statistics of the Pacific Mills indicate that less than a half per cent. of those severely attacked by influenza acquired pneumonia.

3. Broncho-pneumonia was rare in the hospitals.

4. The pneumonia mortality rate was probably not increased, perhaps diminished, as compared with that of the five previous years.

5. The number of cases of pneumonia not preceded by grippe symptoms was about the same as the number of pneumonias in an average year.

6. Pneumonia followed grippe in so large a number of cases as to show some sort of connection between the affections.

7. In sixty per cent. of the cases a single lobe only was involved.

8. Two thirds of the cases terminated by lysis.

9. Pneumonia was three times as frequent in males as in females, and the mortality rate increased with each decade.

10. The most striking increase in the urban deaths from pneumonia was, on the whole, between the ages of twenty and sixty and eighty and ninety. The increase under ten was slight.

11. The gross appearances in nine cases examined after death were not specially noteworthy.

In conclusion, I wish to express my thanks to Dr. Lyman, Dr. Mason, and Dr. G. B. Shattuck, of the City Hospital, and Dr. Fitz, of the Massachusetts, for kindly according me the full use of their records, and to Dr. J. P. Clark for indefatigable zeal in collecting the facts embodied in my paper.